

WHAT IS CLAIMED IS:

1. A method of treating the NO_x emissions from a diesel engine having a main fuel line that carries diesel fuel to the engine and a main exhaust line that carries 5 exhaust from the engine, the method comprising the steps of:

mixing a portion of diesel fuel from the main fuel line with air;

10 receiving the mixed portion of diesel fuel and air into a partial oxidation unit;

using the partial oxidation unit to partially oxidize the portion of diesel fuel into a gas mixture containing hydrogen;

15 delivering the gas mixture to the main exhaust line;

placing a hydrogen selective catalytic reduction unit in line on the main exhaust line, such that the hydrogen selective unit receives the exhaust and the gas mixture; and;

20 using the hydrogen selective catalytic reduction unit to convert the NO_x emissions into nitrogen.

2. The method of Claim 1, wherein the partial oxidation unit is a non-stoichiometric burner.

25 3. The method of Claim 1, wherein the partial oxidation unit is a catalyst.

4. The method of Claim 1, wherein the partial oxidation unit is a nickel-based catalyst.

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5. The method of Claim 1, wherein the partial oxidation unit is a rhodium-based catalyst.

6. The method of Claim 1, wherein the partial oxidation unit is a combination of a non-stoichiometric burner and a catalyst.

5 7. The method of Claim 1, wherein the hydrogen selective catalytic reduction unit is ruthenium-based.

8. The method of Claim 1, wherein the hydrogen selective catalytic reduction unit is platinum-based.

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9. The method of Claim 1, further comprising the step of using a water gas shift catalyst to receive the gas mixture from the partial oxidation unit and to generate additional hydrogen in the gas mixture.

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10. A method of treating the NO_x emissions from a diesel engine having a main fuel line that carries diesel fuel to the engine and a main exhaust line that carries exhaust from the engine, the method comprising the steps 5 of:

receiving a portion of diesel fuel from the main fuel line into a partial oxidation unit;

receiving a portion of the exhaust from the main exhaust line into the partial oxidation unit;

10 using the partial oxidation unit to partially oxidize the portion of diesel fuel into a gas mixture containing hydrogen;

delivering the gas mixture to the main exhaust line;

15 placing a hydrogen selective catalytic reduction unit in line on the main exhaust line, such that the hydrogen selective unit receives the exhaust and the gas mixture; and

using the hydrogen selective catalytic reduction unit to convert the NO_x emissions into nitrogen.

11. The method of Claim 10, wherein the partial oxidation unit is a non-stoichiometric burner.

12. The method of Claim 10, wherein the partial
5 oxidation unit is a catalyst.

13. The method of Claim 10, wherein the partial oxidation unit is a nickel-based catalyst.

10 14. The method of Claim 10, wherein the partial oxidation unit is a rhodium-based catalyst.

15 15. The method of Claim 10, wherein the partial oxidation unit is a combination of a non-stoichiometric burner and a catalyst.

16. The method of Claim 10, wherein the hydrogen selective catalytic reduction unit is ruthenium-based.

20 17. The method of Claim 10, wherein the hydrogen selective catalytic reduction unit is platinum-based.

25 18. The method of Claim 10, further comprising the step of using a water gas shift catalyst to receive the gas mixture from the partial oxidation unit and to generate additional hydrogen in the gas mixture.